

REMARKS

Claims 1-15 are pending in this application. Claims 1-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,140,198 to Atherly et al. (hereinafter "Atherly") in view of U.S. Patent No. 5,438,301 to Havens et al. (hereinafter "Havens") and further in view of U.S. Patent No. 5,239,274 to Chi (hereinafter "Chi").

By the foregoing amendments, Applicant has amended claims 1, 7, and 13 to clarify the coupling between the combiner, mixer, and phase shifters. Claims 8 and 11 have been amended to clarify the language used regarding the shifting means.

Using the configuration of the present invention provides superior in-phase and quadrature carriers than Atherly, facilitating the construction of a simpler, more cost effective circuit design. The use of this configuration does not require costly elements, such as the level shift and inverter 36 of Atherly making the invention more cost efficient and simpler than the prior art. To illustrate, the exemplary embodiment of the invention uses only four delay cells to produce highly accurate in-phase and quadrature carriers. Using a low cost ring oscillator provides the unexpected additional benefit of removing the need for other components, such as level shift and inverters.

Atherly discloses an image-rejecting mixer circuit 10 having an input buffer 12, a local oscillator 29, and two mixers 22, 24. A received signal is passed via the

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input buffer 12 to the mixers 22, 24. The local oscillator 29 signal is passed directly to the mixer 22, where it is mixed with the received signal to produce the in-phase (I) component. The I component is subsequently adjusted by a level shift and inverter 36 to compensate for signal loss, see Atherly, col. 4, lines 2-3. The local oscillator 29 signal is also phase shifted by 90° in phase shifter 32 and is passed to mixer 24, where the signal is mixed with the received signal to produce the quadrature phase (Q) component. The Q component is phase shifted by 90° in phase shifter 42, and is summed with the compensated I component in summing circuit 40. The circuit 10 of Atherly has the same drawbacks as the prior art described in the present application, namely, that the phase difference between the carrier signal produced by the local oscillator and the quadrature carrier signal may not be maintained at an ideal 90°, requiring compensation circuitry; see page 4, lines 1-4 of the present application.

The Examiner's position is that it would have been obvious to one of ordinary skill in the art to replace the oscillator and phase shift circuit of Atherly with a ring oscillator, such as the one disclosed in Havens. The Examiner further states that it would have been obvious to one of ordinary skill in the art to use the differential ring oscillator of Chi in combination with Atherly and Havens to create the present invention.

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However, there is no suggestion in any of the references to combine them to create the invention of the present application. Let alone produce the more reliable, lower cost configuration of the present invention. “The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” (MPEP, §2143.01, citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990), emphasis in original.)

A statement that modifications of the prior art to meet the claimed invention would have been “well within the ordinary skill of the art at the time the claimed invention was made” because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. (MPEP §2143.01, citing *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993), emphasis in original.)

Because there is no suggestion in any of the cited references to combine them, the invention as defined in claims 1, 7, and 13 of the present application is not obvious, and is therefore allowable. Because the independent claims (i.e., claims 1, 7, and 13) are allowable over the cited references, the dependent claims (i.e., claims 2-6, 8-12, 14, and 15) are also allowable, and no additional discussion of the dependent claims is necessary.

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It is respectfully submitted that the amendments and remarks made herein place pending claims 1-15 in condition for allowance. Accordingly, entry of this amendment as well as reconsideration and allowance of pending claims 1-15 are respectfully requested.

If the Examiner does not believe that the claims are in condition for allowance, the Examiner is respectfully requested to contact the undersigned at 215-568-6400.

Respectfully submitted,

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